2017

Florida Orthodontist Participation as Medicaid Providers

Lisa Brooks
Nova Southeastern University

FLORIDA ORTHODONTIST PARTICIPATION AS MEDICAID PROVIDERS

LISA A. BROOKS, D.D.S.

A Thesis Presented to the Faculty of the College of Dental Medicine of Nova Southeastern University in Partial Fulfillment of the Requirements for the Degree of

MASTER OF SCIENCE

December 2017

FLORIDA ORTHODONTIST PARTICIPATION AS MEDICAID PROVIDERS

By

Lisa A. Brooks, D.D.S.

A Thesis Submitted to the College of Dental Medicine of Nova Southeastern University in Partial Fulfillment of the Requirements for the Degree of

MASTER OF SCIENCE

Department of Orthodontics and Dentofacial Orthopedics

College of Dental Medicine Nova Southeastern University

December 2017

Approved as to style and content by:

APPROVED BY:_____

Diane Ede-Nichols, D.M.D., M.H.L., M.P.H. (Committee Chair) Date

APPROVED BY:_____

Shiva Khatami, D.D.S., Ph.D. (Committee Member) Date

APPROVED BY:_____

Patrick Hardigan, Ph.D. (Committee Member) Date

APPROVED BY:_____

Linda Niessen, D.M.D., M.P.H., M.P.P. Date

(Dean, College of Dental Medicine)

NOVA SOUTHEASTERN UNIVERSITY

Health Professions Division Department of Orthodontics College of Dental Medicine

STUDENT NAME: Lisa A. Brooks, D.D.S.

STUDENT E-MAIL ADDRESS: lb1721@mynsu.nova.edu

STUDENT TELEPHONE NUMBER: (703)424-3392

COURSE DESCRIPTION: Masters of Science

TITLE OF SUBMISSION: Florida Orthodontist Participation as Medicaid Providers

DATE SUBMITED: December 13, 2017

I certify that I am the sole author of this thesis, and that any assistance I received in its preparation has been fully acknowledged and disclosed in the thesis. I have cited any sources from which I used ideas, data, or words, and labeled as quotations any directly quoted phrases or passages, as well as providing proper documentation and citations. This thesis was prepared by me, specifically for the M.Sc.D. degree and for this assignment.

STUDENT SIGNATURE:_____

Lisa Brooks, D.D.S. Date

Dedication

To my husband Michael who continues to motivate me to become a better wife, mother, and orthodontist.

To my daughter Charlotte for teaching me that I am capable of doing anything I set my mind to and for showing me a new level of love.

To my parents and grandparents for all of your support throughout my education.

Acknowledgment

I would like to acknowledge the following individuals:

Dr. Diane Nichols for chairing my thesis committee. Thank you for your support throughout the entire process.

Dr. Shiva Khatami for serving on my committee. I appreciate all of your patience and insight during this project.

Dr. Patrick Hardigan for serving on my committee. Thank you for your contributions during this process.

My co-resident Marc Weber and my assistant Tiffany Lu. Thank you for the hours you dedicated to our mutual interest in our survey participants. I appreciate every bit of educational and emotional support you've given me.

ABSTRACT

FLORIDA ORTHODONTIST PARTICIPATION AS MEDICAID PROVIDERS

DECEMBER 15 2017

LISA ANN BROOKS, B.S.,THE CATHOLIC UNIVERSITY OF AMERICA, D.D.S. VIRGINIA COMMONWEALTH UNIVERSITY SCHOOL OF DENTISTRY

Directed by: Professor Diane Ede-Nichols, D.M.D., M.H.L., M.P.H., Section of Community & Public Health Science, Nova Southeastern University College of Dental Medicine

Background

Low-income families are usually unable to afford the cost of orthodontic treatment. The Medicaid program exists to assist these families' access to medical and dental care, including orthodontics in children and adolescents with severe malocclusions. There exists a contrast between need and care-received, which is a product of several general factors. This study will examine the factors involved with orthodontist participation.

Previous studies have indicated that low reimbursement rates and excessive paperwork are among the reasons that providers choose not to participate in Medicaid. New studies have identified factors that were accurately able to predict if a dentist is a Medicaid participant.

Specific Aims

1. Describe the prevalence of Medicaid participation among orthodontists in the state of Florida.
2. Examine the determinants of Medicaid participation among Florida orthodontists.

Significance

This study may encourage public health policy changes that benefit orthodontists, patients, and communities. Our study shows the unified opinion of Florida orthodontists that the Medicaid program has a significant administrative burden, including a low reimbursement rate. This points to potential solutions to increase program participation, namely increasing the reimbursement rate and streamlining the process for case approval.

Innovation

To our knowledge, previous studies have not identified factors that predict Medicaid participation among Florida's orthodontists.

Research Plan

This study used a survey distributed by e-mail and conventional mail to a every actively practicing orthodontist in Florida. A lottery-entry was offered as an incentive to encourage study participation. The survey consisted of questions in four different categories: practitioner demographics, practice demographics, the Perceived Barriers Scale and the Social Responsibility Scale.

Results

Our study found that past Medicaid participation was the only significant determinant of current Medicaid participation. We found few associations between orthodontists' Medicaid participation and their sense of social responsibility to provide for the needs of underprivileged and minority populations.

Conclusion

Our study shows the unified opinion of Florida orthodontists that the Medicaid program has a significant administrative burden. The finding that past Medicaid participation is a predictor of current participation may suggest that the utilization of Medicaid covered orthodontics may increase if orthodontists receive early exposure to Medicaid's processes, criteria, and practice implications.

Table of Contents

List of Tables

List of Figures

Chapter 1: Introduction

1.1: Medicaid and Orthodontics

The Medicaid program was initiated in 1965 to increase access to medical and dental care for low-income families, children, adults, and the medically needy.[1] Income, household size, disability, family status are factors that the U.S. Department of Health and Human Services under the Centers for Medicare and Medicaid Services (CMS) uses to determine eligibility for the Medicaid program.[2] With Medicaid coverage, qualifying individuals are provided with no-cost health insurance. The funds for the program come from both federal and state governments, but are regulated on the state level. Some states have expanded the Medicaid program to use income as the only qualifying factor. In these states, the qualifying household or individual income threshold is set at below 133% of the federal poverty level. Medical and dental coverage for children from needy families with modest incomes too high to qualify for Medicaid may be covered under an additional federal-state funded program, entitled Children's Health Insurance Program (CHIP). These families' incomes may be up to 200%, 250% or 300% of the federal poverty level, depending on a state's expansion of the program.[3] In the state of Florida, legislature has not expanded the Medicaid program. It is up to the state's Department of Children and Families and the Social Security Administration to determine Medicaid recipient eligibility and the Agency for Health Care Administration to administer the Medicaid program.[8]

States are required to provide dental benefits for children up to age 19 with Medicaid or CHIP coverage, which includes medically-necessary preventative and restorative services. This includes "relief of pain and infections, restoration of teeth,

maintenance of dental health".[4] These needs are assessed by the Early and Periodic Screening, Diagnosis, and Treatment Program (EPSDT) component of the Medicaid program. In cases of "handicapping malocclusion (that) creates a disability and impairment to physical development"[5], orthodontic treatment may be covered by Medicaid. The Centers for Medicare and Medicaid Service (CMS) defines a handicapping malocclusion as "a condition that constitutes a hazard to the maintenance of oral health and interferes with the well-being of the patient by causing impaired mastication, dysfunction of the temporomandibular articulation, susceptibility to periodontal disease, susceptibility of dental caries, and impaired speech due to malpositions of the teeth." It is the responsibility of individual states to define what a handicapping malocclusion is by creating their own orthodontic qualification index. In an effort to provide a clearer foundation for this definition, the American Association of Orthodontists (AAO) released a statement from their House of Delegates in 2014 that medically necessary orthodontics may be defined as "treatment of a malocclusion (including craniofacial abnormalities/anomalies) that compromise the patient's physical, emotional or dental health."[6] Since then, various committees in the AAO have advocated that Medicaid-covered orthodontics should be based on a list of automatically-qualifying criteria, rather than by an index, for simplicity of case approval by the paying insurance group. [6]

In the state of Florida, various managed care programs administer dental benefits for the Medicaid and CHIP programs. They have set criteria for orthodontic case qualification in Florida, which only includes potential coverage for children under age 21.[9] In order to determine qualification for covered orthodontic treatment to prove medical

necessity, the following items are required: a) an Initial Orthodontist Assessment Form (IAF) b) a narrative or rationale including diagnosis/treatment plan (on a case by case basis) c) a lateral cephalometric radiograph and d) study models or OrthoCad equivalent or appropriate photographs.[7] The Initial Orthodontist Assessment Form uses the Handicapping Labio-Lingual Deviation (HLD) Index in order to assess the severity of malocclusions. General automatically qualifying criteria include a) cleft palate deformities b) deep impinging overbite that causes visible damage to the palatal soft tissue c) crossbite of individual anterior teeth resulting in soft tissue destruction d) severe traumatic deviations or e) overjet greater than 9 millimeters or reverse overjet is greater than 3.5 millimeters. If a patient doesn't have an automatically qualifying malocclusion, the HLD Index also scores the severity of a patient's a) overbite/open bite b) mandibular dental protrusion or reverse overjet c) ectopic eruption d) anterior crowding e) labio-lingual spread and f) posterior unilateral crossbite to determine coverage eligibility.[7] These criteria explicitly do not include esthetic consideration.

In order for a doctor, dentist, or orthodontist to become an approved provider of Medicaid-covered treatment, they must fulfill certain requirements. These include completing the Provider Enrollment Application, providing fingerprint documentation, consenting to a criminal history check, consenting to an on-site inspection of your office, and completing several other administrative forms.[8]

Nationwide low rates of utilization of the Medicaid program in dentistry have been reported. From 2012-2014, a nationwide median of 48% of Medicaid or CHIP enrolled children received preventative dental services, such as prophylaxis or sealants.[10] During this

period, a median rate of 22% of enrolled children received any sort of dental treatment, such as fillings or extractions. This measure ranged from 11-52% utilization across states.[10] During this timeframe in Florida, only 27.1% of Medicaid enrolled children received preventative dental services and 12.1% received any dental treatment, which were among the lowest rates in the nation.[10] These rates have slightly improved more recently, with 13.7% of these children receiving any dental treatment service during the 2015 federal fiscal year.[11] Rates specific for Medicaid-covered orthodontic services have not been found to be published in any governmental reports. However, the low utilization of general dental treatment within Florida's Medicaid program strongly suggests that orthodontic utilization will also be low. This high likelihood of low orthodontic utilization may be supported by a 2013 study of Iowa orthodontic Medicaid participation, which revealed that only 3% of Medicaid-enrolled children and adolescents received orthodontic treatment.[51]

Strict criteria for case qualification and extensive paperwork for doctors to become an approved Medicaid provider are just two of the several reasons that have been reported to be factors in a low utilization of the Medicaid program in dentistry.[1] Negative experiences in the dental care system and lack of patient education, which may lead to more missed appointments, have also been reported to be reasons why Medicaid-covered patients may limit their utilization of benefits. Among these negative experiences are reported difficulties in finding providers and scheduling available appointments, lack of transportation, long wait times, and a sense of judgmental or disrespectful behavior from staff and providers.[17]

1.2: Common Orthodontist Complaints with the Medicaid Program

Research has shown that a low participation of providers contributes to the access to care problem across the country.[18] The low rate of doctor participation is reported to be affected by "low reimbursement rates, the need for prior authorization, denial of payment, restrictions in reimbursable services, payment delays, and broken appointments".[1] Previous research in the medical field has found a "positive correlation between state Medicaid fees and the fraction of private physicians who treat Medicaid patients".[12 13 14] The Florida Agency for Health Care Administration reports the following reimbursement rates for orthodontic treatment:

D8080: Comprehensive orthodontic treatment of the adolescent dentition: $564.79

D8670: Periodic orthodontic treatment visit: $77.29

D8680: Orthodontic retention (removal of appliances, construction and placement of retainer(s)): $158.87

D8692: Replacement of lost or broken retainer: $93.64

Medicaid allows a maximum of 24 billable adjustment visits (code D8670) within a 36-month time frame and one replacement retainer per arch, per lifetime. Therefore, the cumulative reimbursement rate for orthodontic treatment in Florida is $2,765.90.[15 16] In a nationwide study conducted in 2006, it was found that the average Medicaid reimbursement amount was 63% that of the average private practice treatment fee, after adjusting for geographical regional variation. States' Medicaid reimbursement ranged from 50-74% of the average private fee.[19] A 2014 study showed that the median overhead percentage for specialty practices was 74.9%.[20] With the comparison of average Medicaid

reimbursement to overhead, one can see how it may be challenging for orthodontists to financially break-even with Medicaid patients. However, treating Medicaid patients may not be a devastating financial move: A study conducted in the state of North Carolina found that under a specific set of practice criteria, including 5 percent of a practice's patient pool for Medicaid patients would not likely have a negative financial impact on the practice as long as the practice was able to monetarily break-even with the Medicaid reimbursement.[21] Regardless, the incongruity between reimbursement rate and the treatment's value has been supported by the American Dental Association, who has stated that Medicaid reimbursement rates do not "provide a valid reflection of market-based dental fees".[22]

Another significant factor in low Medicaid participation among dentists has been recognized by the U.S. Department of Health and Human Services to be "cumbersome administrative procedures and extensive paperwork".[23] A study of Florida dentists reported that complicated Medicaid filing procedures along with slow or denied payments were significant reasons for dentists to not participate in the program.[24] These difficult filing procedures include prior authorization, complex billing practices, and the time and effort required to determine patient eligibility, which are often more "complex, unfamiliar, and unusual" than private dental insurance programs.[25]

Unfortunately, some studies have also shown that dentists have reported patient-related reasons for being discouraged from participating in Medicaid. The most common of these types of reasons are broken or last-minute cancelled appointments. Other patient-related reasons for providers' reported dissatisfaction with participating in the program are an increase in treatment non-compliance, i.e. broken brackets, poor use of elastics, and

poor oral hygiene.[26] In a study conducted at the orthodontic residency program at The University of Tennessee, Medicaid patients were found to be 6 times more likely than self-pay patients to miss an appointment. The Medicaid patients at this clinic were also 5.5 times more likely to be dismissed and have early appliance removal due to non-compliance, although they did not break brackets or appliances more frequently than self-pay patients.[26] Likewise, the graduate clinic at Virginia Commonwealth University found that Medicaid patients failed to meet 15% of their appointments, compared to self-pay patients that missed 8% of appointments.[27] However, there are studies that have shown no significant difference in missed appointments or patient compliance between Medicaid and self-pay patients in private practice settings.[28]

In addition to these pragmatic reasons for not participating in Medicaid, research has shown that the dentist's/orthodontist's sense of social responsibility may be a significant factor. "Economics, professionalism, individual choice, and politics" affect dentists' sense of social responsibility.[40] While economic reasons are the most commonly cited reason for not participating in Medicaid, it is important to also consider factors such as doctor autonomy and doctor opinions on access to orthodontics as a largely elective procedure.[40] Clinical psychology's Theory of Reasoned Action demonstrated that attitudes are the best predictors of behavior.[43] This theory was expanded to form the Integrated Behavioral Model, which focuses on the determinants of behavioral intention. The main categories of these determinants include attitudes, perceived norms, and self-efficacy or the perceived control over one's ability to perform an action.[43] The choice an orthodontist has whether to accept Medicaid can be similarly broken down by these psychological

components. This theory has informed the aims of this study to determine whether the opinion of orthodontists' peers and/or their financial power over which insurances to accept (including Medicaid) are predictive of orthodontist's participation in Medicaid.

1.3: Poverty, Race, and Orthodontics

Nationwide studies have shown that racial and socioeconomic disparities exist in the orthodontic care received by children aged 20 or younger.[32 33] Children that had private dental insurance or were uninsured (and able to pay for treatment out of pocket) make up the majority of children that receive orthodontic care. Children with public insurance such as Medicaid receive orthodontic services least frequently. It has also been found that fewer African American children receive orthodontic treatment than other racial groups: only 9% of African Americans versus 18% of whites and 10.5% of Hispanics.[33] Previous studies have also found that severe malocclusion is observed more frequently among African Americans than other racial groups.[34 36] It is likely that one of the causes behind this racial disparity in orthodontic treatment received is socioeconomic in origin, as it is well documented that orthodontic treatment is greater in higher income groups[34] and that unequal poverty rates exist between racial groups nationwide.[35] As of 2015 9.1% of non-Hispanic whites, 24.1% of blacks, 11.4% of Asians, and 21.4% of Hispanics (any race) lived in poverty.[31] Within Florida, a similar 9.8% of white, 23.7% of black, and 18.9% of Hispanic family households live in poverty.[49]

Interestingly, studies have also shown that the race of an orthodontist may be related to their decision to accept Medicaid. In a 2013 study of Florida pediatric and general

dentists that treat children, it was found that of the dentists that participate in Medicaid (for preventative and restorative procedures), a greater proportion were Hispanic and black. Of Medicaid participating dentists, 32 percent were Hispanic versus almost 18 percent of non-participants.[37] Similarly, black dentists were reported to constitute 13 percent of Medicaid participants and 2.4 percent of non-participants.[37] This relationship was supported by findings from studies conducted in other states as well. In Wisconsin it was found that racial/ethnic minority dentists were twice as likely as non-Hispanic white dentists to accept new Medicaid patients.[38] This is likely to be partially due to the racial disparity in the U.S. dental workforce versus the total U.S. population. It has been recently reported that racial and ethnic minorities comprise approximately 30 percent of the total U.S. population[41] but only 13 percent of the dental workforce.[42] The racial/ethnic difference in decision-making among Medicaid providers has also been found in medical literature: "…minority physicians are significantly more likely than White physicians to care for minorities and the poor, practice in urban communities designated as physician-shortage areas, and practice in areas where access to care is limited"[38] [39]

1.4: Florida's Unique Population

Florida's unique racial and ethnic demographics may have an effect on orthodontic Medicaid participation. As of 2016, the U.S. Census estimates that 24.9% of Florida's population was Hispanic[29] and that as of 2010, 42% were minorities[30]. These percentages are significantly greater than the total U.S. percentages: In 2016 the total U.S. population was 17.8% Hispanic[29] and in 2010, 36% were racial minorities[30].

According to the most recent 5-Year U.S. Census Community Survey report, 24.1% of all children under 18 in Florida live in poverty.[49] This is more severe a situation that the nationwide percentage of 19.7% of children that live in poverty.[31] This elevated socio-economically disadvantaged population places an increased demand for government-subsidized healthcare, and therefore indirectly an increase in the demand for Medicaid-covered orthodontics.

Florida's socio-economically disadvantaged population is also unevenly distributed throughout the state. Of Florida's 67 counties, 40 have poverty rates above the state average of 16.6%.[49] Most of these poorer counties are the rural counties of central and northern Florida, although five of Florida's ten most populated counties also have above average poverty rates. The county with the highest poverty rate of 20.4% is Miami-Dade[49], which also has the state's largest population of Hispanics.[50]

Since more racial and ethnic minorities in America live in poverty than non-Hispanic whites, it is reasonable to suggest that this distribution of poverty affects minority oral health care to a greater extent. Florida's relatively large minority population may therefore have greater needs in healthcare, oral health, and orthodontics compared to the national average.

1:4: Current Study

1:4:1: Purpose

To our knowledge, previous studies have not identified factors that predict Medicaid participation among Florida's orthodontists. The results of our study seek to identify what

Florida orthodontists perceive as barriers to participation in the Medicaid program and to gauge their sense of social responsibility in doing so. Determining the factors that are associated with Medicaid participation among Florida orthodontists may also illuminate potential opportunities for Medicaid policy improvement and for changes of social perception on the level of local dental or orthodontic societies. The access to orthodontic care will be assessed through the number of reported cases treated with discounted fees and those with Medicaid funding.

1:4:2: Specific Aims

Specific Aim 1: To describe the prevalence of Medicaid participation among orthodontists currently practicing in the state of Florida.

Specific Aim 2: To examine the association of Medicaid participation among orthodontists currently practicing in the state of Florida and sociodemographic and practice characteristics, orthodontists' perception of social responsibility in assisting underprivileged populations, and the factors gauged by the Perceived Barriers and Social Responsibility scales.

1:4:3: Hypotheses

Hypothesis: Orthodontists will be more likely to be Medicaid providers if they perceive a social responsibility in assisting underprivileged populations. Orthodontists will be less likely to be Medicaid participants if they perceive significant barriers to participation.

Chapter 2: Methods

2.1. Study

This study involved the distribution of a questionnaire to all actively practicing orthodontists in the state of Florida. The survey consisted of questions in four different categories: orthodontist demographics, practice characteristics, a Perceived Barriers Scale, and a Social Responsibility Scale. The Perceived Barriers Scale and the Social Responsibility Scale were used to identify predictors of an orthodontists' decision to participate in Medicaid. The survey instrument used in Logan's study "correctly predicted whether a dentist was a Medicaid participant 90.5% of the time."[46] Therefore, we adjusted the Perceived Barriers and Social Responsibility Scales to be targeted towards the community of orthodontic specialists.

2.2. Participants

In this cross-sectional study, data was gathered by means of a probability sampling method involving a questionnaire sent out to the 461 AAO-member and 14 non-AAO-member actively practicing Florida orthodontists. A list of orthodontists was compiled using the directory of American Association of Orthodontists (AAO) members and cross matching Yellow Page listings of orthodontists in every county of Florida to ensure that non-AAO members were also included. The inclusion criteria of the participants of this study are that they: a) are orthodontists that actively practice in the state of Florida and limit their practice to orthodontics and b) speak English. Individuals who did not fulfill the inclusion criteria

were excluded from the study. Each orthodontist was given a participant identification number in order to keep track of non-responders.

2.3. Solicitation and Recruitment

Following acceptance of the informed consent, participants were provided the self-administered survey instrument. Individuals wishing to decline participation in the study had the ability to opt-out from the study at any time. All responses were anonymous: Participant contact information was disassociated from survey response data and stored on a separate password-protected university server file.

Survey administration was similar to Dillman's Total Design Method. [44] This method prescribes a series of communications with prospective survey participants in order to maximize response rates. The communications include an initial paper-copy invitation to participate with an explanation of the study and the survey instrument. One week following the initial invitation, a second paper-copy invitation and survey was sent to the participants. One week following the second paper-copy, an e-mail was sent with an internet link to the electronic informed consent and survey instrument that is housed on the secure, HIPAA-compliant NSU REDCap web site. One week following this electronic invitation, a final paper-copy survey was sent. One week following the final paper-copy survey a final e-mail was sent to non-responders. At each stage of communication, participants were thanked for their time and effort to participate. Upon receipt of completed surveys, an incentive was offered to encourage study participation that consisted of an entry into a drawing for a $1000 gift card to Best Buy, a popular electronic super-store.

2.4. Survey Instrument

The survey instrument involved 45 questions, including an area for any comments at the end of the questionnaire. Construct validity was derived from using previously validated Perceived Barriers and Social Responsibility scales.[45 46] The Perceived Barriers and Social Responsibility scale questions, concerning the attitudes Florida orthodontists have regarding Medicaid, were modeled after the recent study done by Logan et al in 2015.[46] The survey was constructed ensure that it took no longer than 15 minutes to eliminate response fatigue.[47 48]

2.5. Dependent Variables

For Specific Aim 2: The dependent variable was Medicaid participation among Florida orthodontists, as measured by question number 12, "Do you currently accept Medicaid patients for orthodontic treatment?".

2.6. Independent Variables

For Specific Aim 2, sociodemographic and practice characteristics, Florida orthodontists' perception of social responsibility in assisting underprivileged populations, and perceived barriers to Medicaid participation.

Attitude was assessed by inquiry of orthodontists' perception of how important various factors are in the decision to accept or not accept Medicaid patients. This was measured by responses on a 4-point Likert scale dichotomized to "unimportant" or "important". Attitudes concerning orthodontists' social responsibility were assessed based

on how they reported their agreement or disagreement on a 4-point Likert scale.

2.7. Statistical Analysis

Our statistical plan included univariate and bivariate analyses for descriptive statistics. We also conducted two parallel principal component analyses for the barrier and responsibility questions. A multivariable logistic regression analysis was also performed along with odds ratios odds ratio with a 95% confidence interval) of whether or not an orthodontist participates in Medicaid.) Concordance index was also calculated to give an estimation of regression model's ability to predict the outcome of Medicaid participation.

Chapter 3: Results

3.1. Participation Summary

Of the 473 orthodontists solicited for responses, 128 responded, giving our study a 27% response rate.

3.2 Descriptive Statistics

The mean age of responders was 49.8 (+/- 12.0) The median response for the number of Medicaid starts in 2016 was 0 (IQR = 0), while the median for reduced-fee starts was 4 (IQR = 10).

Univariate and bivariate analyses are presented in Table 1 to Table 6. Prior to the analysis we conducted two parallel principal component analyses for the Perceived Barrier and Social Responsibility questions. Through this method we uncovered two distinct constructs for barrier questions (63% of the variance explained) and three for the Responsibility questions (49% of the variance explained). (See below for definitions of the constructs.)

Table 1

Bivariate analyses for practice demographics of Medicaid participants and non-participants by continuous outcome measures

		Medicaid Participation		
		No (N=81)	Yes (N=11)	P-Value
Administrative burden component*	0.00 (0.55)	0.05 (0.50)	-0.34 (0.78)	0.175
Patient/referral related component*	0.00 (0.58)	0.02 (0.57)	-0.17 (0.71)	0.445

Social justice, education, & economics component*	0.00 (0.06)	0.05 (0.05)	-0.02 (0.07)	0.157
Patient compliance component. *	0.00 (0.85)	0.05 (0.84)	-0.40 (0.87)	0.108
Access to care component*	0.00 (1.05)	0.03 (1.02)	-0.23 (1.27)	0.636
Age*	49.89 (12.03)	50.02 (11.71)	48.91 (14.77)	0.678
Medicaid starts**	0 (0,150)	0 (0,65)	50 (0,150)	<0.001
Reduced-fee starts**	4 (0.90)	5 (0,90)	1 (0,30)	0.936

* Mean with standard deviation

** Median with min and max values

86.5% of respondents that don't participate in Medicaid reported working full-time as an orthodontist, while 13.5% of this group reported working part time. 80% of Medicaid participants reported working full time, whereas 20% work part time. 62.5% of Medicaid non-participants were male, 37.5% female. 81.3% of Medicaid participants were male with 18.8% being female.

Table 2. Bivariate analysis for categorical data for doctor demographics

	Full time	Part time			P-Value
Non-participants	90 (86.5%)	14 (13.5%)			0.497
Participants	12 (80.0%)	3 (20.0%)			
	Male	Female			P-Value
Non-participants	65 (62.5%)	39 (37.5%)			0.143
Participants	13 (81.3%)	3 (18.8%)			
	Race				
	White	Black	Asian	Other	P-Value
Non-participants	91 (88.3%)	1 (1.0%)	5 (4.9%)	6 (5.8%)	0.110
Participants	11 (68.8%)	1 (6.3%)	1 (6.3%)	3 (18.8%)	

	Hispanic ethnicity				
	Non-Hispanic	Hispanic			P-Value
Non-participants	89 (85.6%)	15 (14.4%)			0.831
Participants	14 (87.5%)	2 (12.5%)			
	Years in practice				
	>5	5-9	10-20	<20	P-Value
Non-participants	10 (9.6%)	15 (14.4%)	32 (30.8%)	47 (45.2%)	0.051
Participants	5 (31.3%)	2 (12.5%)	6 (37.5%)	3 (18.8%)	
	AAO Membership				
	No	Yes			P-Value
Non-participants	5 (4.9%)	98 (95.1%)			0.367
Participants	0 (0.0%)	16 (100.0%)			
	ABO Certification*				
	No	Yes			P-Value
Non-participants	73 (71.6%)	29 (28.4%)			0.026*
Participants	7 (43.8%)	9 (56.3%)			

Table 3.

Bivariate analysis for categorical data for practice demographics

	Primary employment			
	Solo practice	Co-owner group	Associate of group	P-Value
Non-participants	80 (87.0%)	12 (13.0%)	12 (13.0%)	0.103
Participants	10 (90.9%)	1 (9.1%)	5 (45.5%)	
	Financial authority*			
	No	Yes		P-Value
Non-participants	7 (8.8%)	73 (92.3%)		<0.001*
Participants	3 (27.3%)	8 (72.7%)		
	Past Medicaid acceptance*			
	No	Yes		P-Value
Non-participants	65 (80.2%)	16 (19.8%)		<0.001*
Participants	2 (18.2%)	9 (81.8%)		
	Acceptance of private insurance			
	No	Yes		P-Value
Non-participants	2 (1.9%)	102 (98.1%)		0.575
Participants	0 (0.0%)	16 (100.0%)		

Table 4.

Bivariate analyses for doctor demographics by continuous outcome measures

	Full time (N=81)	Part time (N=11)			P-Value
Barriers	3.33 (0.57)	3.46 (0.49)			0.464
Responsibility	2.33 (0.30)	2.50 (0.36)			0.131
	Gender				
	Male (N=61)	Female (N=31)			P-Value
Barriers	3.27 (0.62)	3.50 (0.39)			0.080
Responsibility	2.32 (0.30)	2.43 (0.32)			0.083
	Race				
	White (N=79)	Black (N=2)	Asian (N=4)	Other (N=7)	P-Value
Barriers	3.32 (0.54)	3.16 (1.17)	3.80 (0.24)	3.47 (0.70)	0.130
Responsibility	2.34 (0.31)	2.50 (0.29)	2.47 (0.42)	3.42 (0.34)	0.805
	Ethnicity				
	Non-Hispanic (N=78)	Hispanic (N=12)			P-Value
Barriers	3.32 (0.56)	3.42 (0.26)			0.158
Responsibility	2.32 (0.31)	2.52 (0.22)			0.032*
	Years in Practice				
	>5 (N=11)	5-9 (N=16)	10-20 (N=25)	<20 (N=40)	P-Value
Barriers	3.44 (0.46)	3.17 (0.71)	3.36 (0.50)	3.39 (0.56)	0.774
Responsibility	2.32 (0.34)	2.28 (0.29)	2.40 (0.33)	2.37 (0.31)	0.775
	AAO Membership				
	No (N=4)	Yes (N=88)			P-Value
Barriers	3.58 (0.16)	3.13 (0.57)			0.992
Responsibility	2.33 (0.14)	2.36 (0.32)			0.993
	ABO Certification				
	No (N=65)	Yes (N=27)			P-Value
Barriers	3.37 (0.54)	3.30 (0.61)			0.409
Responsibility	2.34 (0.32)	2.40 (0.30)			0.410

Table 5.

Bivariate analyses for practice demographics by continuous outcome measures

	Primary employment			
	Solo practice (N=68)	Co-owner group (N=11)	Associate of group (N=13)	P-Value
Barriers	3.32 (0.62)	3.37 (0.36)	3.48 (0.36)	0.776
Responsibility	2.35 (0.31)	2.21 (0.29)	2.49 (0.31)	0.132
	Financial authority			
	No (N=13)	Yes (N=106)		P-Value
Barriers	3.50 (0.37)	3.35 (0.56)		0.949
Responsibility	2.47 (0.30)	2.35 (0.32)		0.361
	Past Medicaid acceptance			
	No (N=67)	Yes (N=25)		P-Value
Barriers	3.39 (0.56)	3.23 (0.56)		0.949
Responsibility	2.32 (0.32)	2.44 (0.28)		0.096
	Acceptance of private insurance			
	No (N=1)	Yes (N=91)		P-Value
Barriers	3.22 (-----)	3.35 (0.56)		0.570
Responsibility	2.11 (-----)	2.36 (0.31)		0.355

We used a difference in median test to compare the groups of Barrier and Responsibility responses to Medicaid participation. P-values less than 0.05 are statistically different. It was found that Medicaid participants found complicated paperwork, the rate of reimbursement, and denial of payment to be less important than did non-participants. Conversely, Medicaid participants were more likely than non-participants to agree that parents with Medicaid-insured children lacked oral health education and that patient who pay for treatment out of pocket would not like being in the same waiting room as Medicaid patients.

Table 6. Bivariate comparisons of Perceived Barriers and Responsibility Scales: Medians

	Non-participants		Participants		
	Median	IQR	Median	IQR	P-Value
Need for prior approval	3.00	1.00	3.00	2.00	0.62
Complicated paperwork*	4.00	1.00	3.00	2.00	0.03*
Frequent changes in regulation	4.00	1.00	3.00	1.50	0.21
Denial of payment*	4.00	0.00	3.00	1.00	0.04*
Rate of reimbursement*	4.00	0.00	4.00	1.50	0.03*
On-and-off eligibility of patients	4.00	1.00	4.00	1.00	0.25
Patients often fail to show for appointments	4.00	1.00	3.00	2.00	0.12
Unruly/uncooperative patient behavior	3.00	2.00	3.00	2.50	0.46
Difficulty in finding other specialists (pediatric dentists, oral surgeons) who accept Medicaid.	3.00	1.00	3.00	1.00	0.76

Patients who pay for treatment out of pocket would not like being in a waiting room with Medicaid patients. *	2.00	2.00	3.00	2.00	0.03*
Ethically, dental professionals are obligated to provide care to the underprivileged.	3.00	1.00	3.00	1.50	0.50
My colleagues will think less of me if they know I see Medicaid patients.	1.00	1.00	2.00	1.00	0.31
I would never turn any patient away regardless of their background or socioeconomic status.	4.00	2.00	4.00	1.00	0.31
The traditional model of fee-for-service dentistry adequately addresses the oral health needs of underprivileged patients.	2.00	1.00	2.00	1.50	0.44
If I became a Medicaid provider I could have a positive impact on my community. *	3.00	1.00	4.00	1.00	0.01*
Children enrolled in Medicaid are less likely to be comply with treatment compared to non-Medicaid patients.	3.00	1.00	2.00	1.00	0.20
Medicaid patients frequently cancel appointments.	3.00	2.00	2.00	1.50	0.10
I do not feel obligated to provide dental care to the underprivileged because we have a free-market economy.	2.00	2.00	2.00	1.00	0.18
Many parents with children receiving Medicaid support lack the education to make informed choices about the oral health needs of their children.*	2.00	2.00	3.00	1.50	0.02*

Access to general healthcare is a right of all people.	3.00	2.00	3.00	2.50	0.57
Access to oral health care is a right of all people.	3.00	2.00	3.00	2.50	0.57
Access to orthodontics is a right of all people.	2.00	2.00	1.00	2.00	0.37
I cannot financially afford to treat Medicaid patients.	3.00	1.00	2.00	2.00	0.40
Neither my dental school nor residency curriculum prepared me to address oral health disparities in underprivileged and minority patients.	2.00	2.00	1.00	0.50	0.19
Medicaid patients have dental needs that are more difficult to treat compared to other patients.	2.00	2.00	1.00	1.50	0.16
I believe orthodontists have a moral responsibility to participate in Medicaid in order to serve the oral healthcare needs of the underprivileged.	1.00	1.00	1.00	1.50	0.74

*p-value of >0.05

Table 7. Bivariate comparisons of Perceived Barriers and Social Responsibility Scales: Means

	Non-participants		Participants		
	Mean	SD	Mean	SD	P-Value
Need for prior approval	3.14	1	2.91	1.22	0.62
Complicated paperwork*	3.48	0.84	2.82	1.17	0.03*
Frequent changes in regulation	3.48	0.71	3	1.18	0.21
Denial of payment*	3.65	0.71	3.27	0.79	0.04*
Rate of reimbursement*	3.77	0.58	3.27	0.9	0.03*
On-and-off eligibility of patients	3.63	0.62	3.27	1.01	0.25
Patients often fail to show for appointments	3.44	0.89	2.91	1.22	0.12
Unruly/uncooperative patient behavior	2.95	1.02	2.64	1.29	0.46
Difficulty in finding other specialists (pediatric dentists, oral surgeons) who accept Medicaid.	3.02	0.96	3.18	0.75	0.76
Patients who pay for treatment out of pocket would not like being in a waiting room with Medicaid patients. *	2.15	0.9	2.91	1.22	0.03*
Ethically, dental professionals are obligated to provide care to the underprivileged.	2.58	0.92	2.73	1.19	0.5
My colleagues will think less of me if they know I see Medicaid patients.	1.56	0.79	1.91	1.14	0.31
I would never turn any patient away regardless of their background or socioeconomic status.	3.1	1.08	3.45	0.93	0.31
The traditional model of fee-for-service dentistry adequately addresses the oral health needs of underprivileged patients.	1.94	0.81	2.18	0.98	0.44
If I became a Medicaid provider I could have a positive impact on my community. *	2.63	0.93	3.45	0.69	0.01*
Children enrolled in Medicaid are less likely to be comply with treatment compared to non-Medicaid patients.	2.6	0.98	2.09	0.94	0.2
Medicaid patients frequently cancel appointments.	2.98	0.89	2.55	1.13	0.1
I do not feel obligated to provide dental care to the underprivileged because we have a free-market economy.	2.21	0.96	1.82	0.98	0.18
Many parents with children receiving Medicaid support lack the education to make informed choices about the oral health needs of their children.*	2.06	0.81	2.82	0.98	0.02*
Access to general healthcare is a right of all people.	2.9	1.02	2.64	1.29	0.57
Access to oral health care is a right of all people.	2.9	1.02	2.64	1.29	0.57
Access to orthodontics is a right of all people.	2.27	1.05	2	1.26	0.37

I cannot financially afford to treat Medicaid patients.	2.58	1.07	2.27	1.19	0.4
Neither my dental school nor residency curriculum prepared me to address oral health disparities in underprivileged and minority patients.	1.93	1.09	1.55	1.04	0.19
Medicaid patients have dental needs that are more difficult to treat compared to other patients.	2.05	0.93	1.64	0.92	0.16
I believe orthodontists have a moral responsibility to participate in Medicaid in order to serve the oral healthcare needs of the underprivileged.	1.63	0.77	1.82	1.08	0.74

*p-value of >0.05

The principal component analysis for the Perceived Barriers scale found two component constructs. Component 1 may be defined as the administrative burden component and component 2 as a patient/referral related component. The variables with significant loading of the administrative burden component were questions 1 through 6. Questions 7 through 9 are the variables that were significant for the patient/referral related component.

Table 8. Principal component analysis for Perceived barriers

Variable	Comp1	Comp2	Unexplained	Component
Need for prior approval	0.305	-0.305	0.473	1
Complicated paperwork	0.369	-0.249	0.345	1
Frequent changes in regulation	0.411	-0.205	0.245	1
Denial of payment	0.340	-0.090	0.516	1
Rate of reimbursement	0.376	-0.127	0.398	1
On-and-off eligibility of patients	0.404	-0.036	0.332	1
Patients often fail to show for appointments	0.245	0.541	0.292	2
Unruly/uncooperative patient behavior	0.222	0.596	0.239	2
Difficulty in finding other specialists (pediatric dentists, oral surgeons) who accept Medicaid.	0.269	0.361	0.499	2

Principal component analysis for the Social Responsibility questions revealed three constructs: 1) Social justice, education, & economics, 2) Patient compliance 3) Access to care. The social justice, education, & economics component is composed on questions 1-6, 9,10, and 14-17. The patient compliance component includes responses from questions 7 and 8 and the access to care component includes responses from questions 11 through 13.

Table 9.

Principal component analysis for Social Responsibility questions

Variable	Comp1	Comp2	Comp3	Unexplained	Component
Patients who pay for treatment out of pocket would not like being in a waiting room with Medicaid patients.	-0.0921	0.3005	0.2932	0.6037	1
Ethically, dental professionals are obligated to provide care to the underprivileged.	0.2998	0.1207	0.2665	0.4607	1
My colleagues will think less of me if they know I see Medicaid patients.	-0.1769	0.2017	0.1509	0.7310	1
I would never turn any patient away regardless of their background or socioeconomic status.	0.2547	-0.0785	0.2570	0.5960	1
The traditional model of fee-for-service dentistry adequately addresses the oral health needs of underprivileged patients	-0.1295	-0.2363	-0.132	0.7661	1
If I became a Medicaid provider I could have a positive impact on my community.	0.1069	0.1510	0.4428	0.5650	1
I do not feel obligated to provide dental care to the underprivileged because we have a free-market economy.	-0.3182	0.0409	-0.2343	0.4700	1
Many parents with children receiving Medicaid support lack the education to make informed choices about the oral health needs of their children.	-0.0168	0.1772	0.2454	0.8223	1

I cannot financially afford to treat Medicaid patients.	-0.1631	0.2137	-0.1804	0.7226	1
Neither my dental school nor residency curriculum prepared me to address oral health disparities in underprivileged and minority patients.	0.0996	0.2672	-0.4037	0.5121	1
Medicaid patients have dental needs that are more difficult to treat compared to other patients.	-0.0737	0.3257	-0.1077	0.7053	1
I believe orthodontists have a moral responsibility to participate in Medicaid in order to serve the oral healthcare needs of the underprivileged.	0.2854	0.1334	0.2167	0.5298	1
Children enrolled in Medicaid are less likely to be comply with treatment compared to non-Medicaid patients.	-0.2273	0.4535	-0.0049	0.2906	2
Medicaid patients frequently cancel appointments.	-0.2287	0.4322	0.0528	0.3282	2
Access to general healthcare is a right of all people.	0.3882	0.2144	-0.2545	0.1364	3
Access to oral health care is a right of all people.	0.4003	0.1969	-0.2279	0.1343	3
Access to orthodontics is a right of all people.	0.3707	0.1359	-0.2280	0.2803	3

3.3. Multivariable Logistic Regression

Using robust generalized linear regression with a binomial distribution we created two models to predict Medicaid participation using the two Perceived Barrier components, gender, race, years in practice, ABO certification, practice type, and financial authority, and past Medicaid acceptance. Prior to the analysis the following variables were recoded:

(1) race was recoded into 1 vs other

(2) practice type was recoded into 1 vs other

(3) financial authority was recoded into 1 vs other.

The model variables were chosen as they represented a bivariate relationship less than 0.20.

Table 10. Regression models

	M1	M2	M3	M4	M5
Administrative burden component	-1.064* (-0.642)				
Patient/referral related component		-0.659 (-0.689)			
Social justice, education, & economics component			-0.214 (-7.168)		
Patient compliance component				-0.657 (-0.488)	
Access to care component					-0.295 (-0.378
Medicaid acceptance	-0.753 (-1.069	-0.907 (-1.026)	-1.01 (-1.035)	-0.932 (-1.042)	-0.951 (-1.033)

Race	0.398	0.793	0.669	0.867	0.760
	(-1.118)	(-1.043)	(-1.048)	(-1.101)	(-1.053)
Years in practice	-0.359	-0.238	-0.265	-0.208	-0.213
	(-0.446)	(-0.438)	(-0.433)	-(0.470)	(-0.441)
ABO certification	1.116	1.276	1.166	1.324	1.190
	(-0.994)	(-0.990)	(-0.955)	(-0.991)	(-0.963)
Practice type	1.081	0.782	0.638	0.871	0.610
	(-1.391)	(-1.309)	(-1.312)	(-1.314)	(-1.31)
Financial authority	-0.361	-0.475	-0.52	-0.375	-0.693
	(-1.535)	(-1.537)	(-1.559)	(-1.638)	(-1.557)
Past Medicaid acceptance	3.179**	3.177**	3.082**	2.999**	3.142**
	(-1.042)	(-1.007)	(-0.994)	(-0.970)	(-0.985)
Constant	-3.76	-3.832	-3.093	-4.051	-3.310
	(-3.815)	(-3.799)	(-3.746)	(-3.995)	(-3.792)
Observations	92	92	92	92	92
Log Likelihood	-21.197	-22.091	-22.55	-21.575	-22.247
Akaike Inf. Crit.	60.395	62.181	63.1	61.149	62.493
Note:	*p<0.1; **p<0.05; ***p<0.01				

Table 11. Odds ratios for models

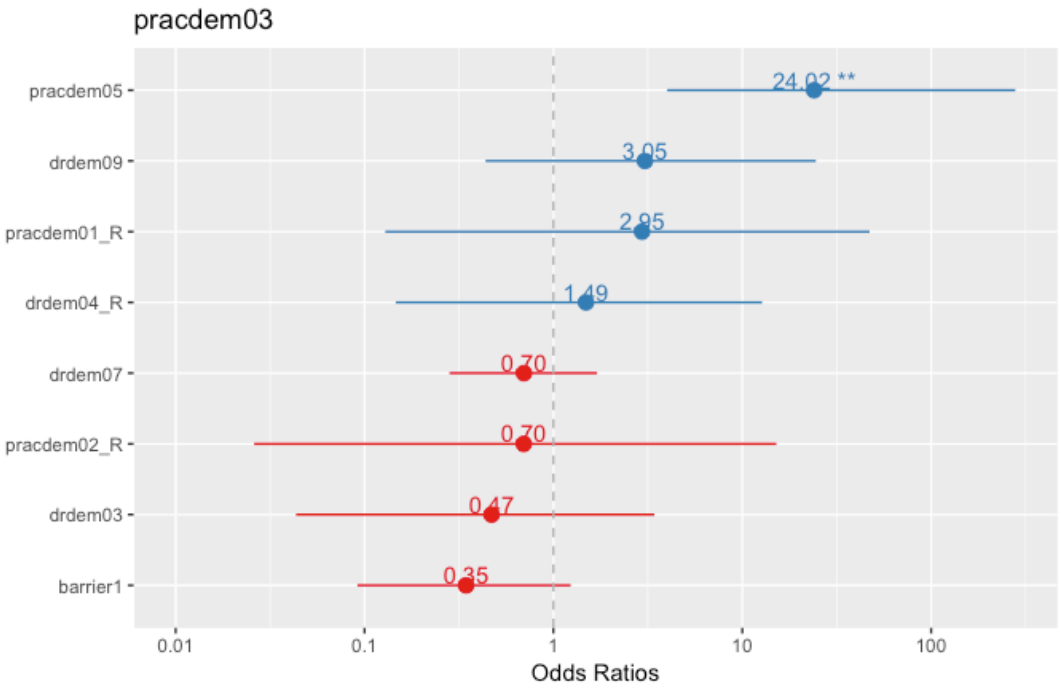
	Parameter	OR	Lower 95% CI	Upper 95% CI
Model 1	(Intercept)	0.02	0.00	51.29
	Administrative burden component	0.35	0.09	1.23
	Gender	0.47	0.04	3.42
	Race	1.49	0.15	12.73
	Years in practice	0.70	0.28	1.70
	ABO certification	3.05	0.44	24.52
	Practice type	2.95	0.13	47.22
	Financial authority	0.70	0.03	15.15
	Past Medicaid acceptance	24.02	4.00	279.04
Model 2	(Intercept)	0.02	0.00	46.85
	Patient/referral related component	0.52	0.13	2.02
	Gender	0.40	0.04	2.62
	Race	2.21	0.26	17.07
	Years in practice	0.79	0.33	1.95
	ABO certification	3.58	0.53	29.63
	Practice type	2.19	0.11	28.08
	Financial authority	0.62	0.02	13.48
	Past Medicaid acceptance	23.98	4.24	260.99
Model 3	(Intercept)	0.05	0.00	89.02
	Social justice, education, & economics component	0.81	0.00	106.00
	Gender	0.36	0.03	2.37
	Race	1.95	0.22	14.96
	Years in practice	0.77	0.33	1.85

	ABO certification	3.21	0.50	23.66
	Practice type	1.89	0.09	23.88
	Financial authority	0.59	0.02	13.68
	Past Medicaid acceptance	21.80	3.87	222.42
Model 4	(Intercept)	0.02	0.00	47.87
	Patient compliance component	0.52	0.18	1.29
	Gender	0.39	0.04	2.65
	Race	2.38	0.25	20.77
	Years in practice	0.81	0.33	2.21
	ABO certification	3.76	0.55	30.67
	Practice type	2.39	0.11	30.04
	Financial authority	0.69	0.02	18.87
	Past Medicaid acceptance	20.07	3.67	195.10

	Parameter	OR	Lower 95% CI	Upper 95% CI
Model 5	(Intercept)	0.04	0.00	75.98
	Access to care component	0.74	0.35	1.59
	Gender	0.39	0.04	2.51
	Race	2.14	0.24	16.87
	Years in practice	0.81	0.34	1.98
	ABO certification	3.29	0.50	24.72
	Practice type	1.84	0.09	23.27
	Financial authority	0.50	0.02	11.21
	Past Medicaid acceptance	23.15	4.21	234.17

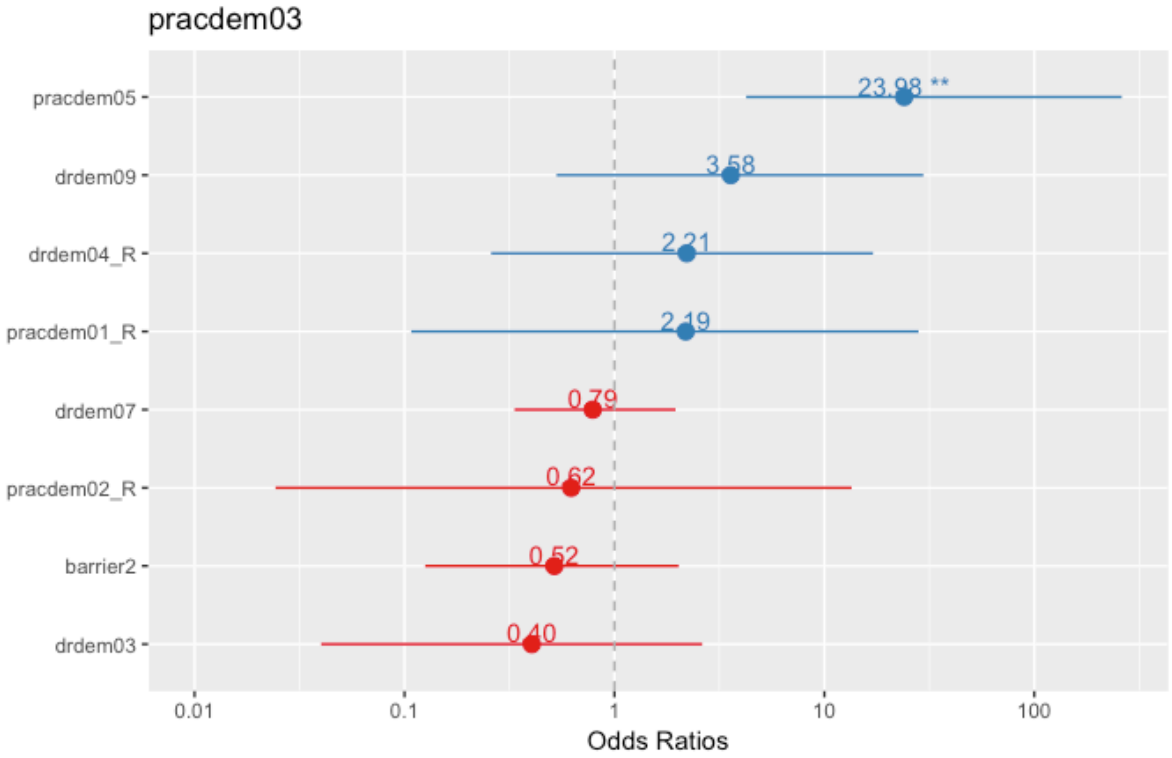
For Model One, barriers and having accepted Medicaid in the past significantly predicted Medicaid participation [C^2 (8) = 8.99, p = 0.347)]—Table 11. Individuals coded as 1 (those who had accepted Medicaid in the past) were 28.48 times (95% CI: 4.00,279.00) more likely to be a current Medicaid provider one than individuals coded as a zero (those who had never accepted Medicaid insurance). Additionally, a one unit increase in the administrative burden component suggests that subjects were 65% less likely to have accepted Medicaid in the past. In this model, the concordance index is fine at 0.879. A c-index greater than 80% is good enough for predicting the outcomes of individuals.

Figure 1. Administrative burden component model one odds ratios



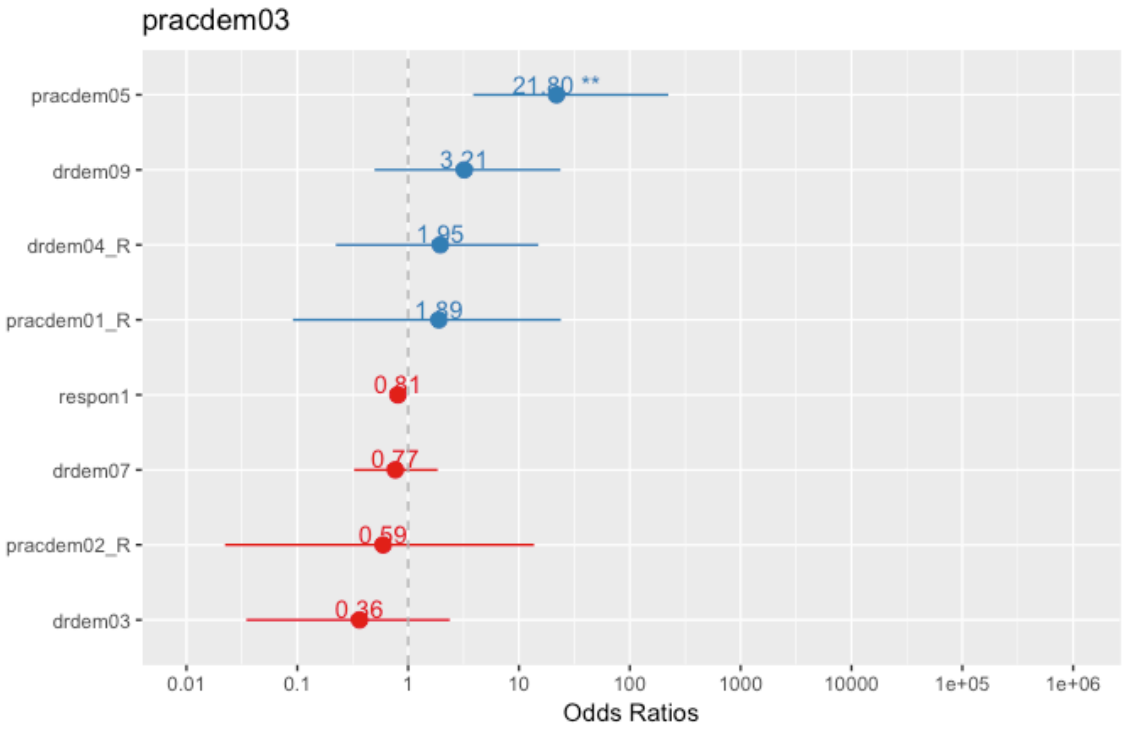
For Model Two, having accepted Medicaid in the past significantly predicted current Medicaid participation [C^2 (8) = 4.37, p = 0.822)]—Table 11. Individuals coded as 1 (who previously accepted Medicaid) were 23.98 times (95% CI: 4.24,260.99) more likely to be Medicaid providers than individuals coded as a zero (those who did not previously accept Medicaid). In this model, the concordance index is fine at 0.888. A c-index greater than 80% is sufficient for predicting the outcomes of individuals.

Figure 2. Patient/referral related component model odds ratios



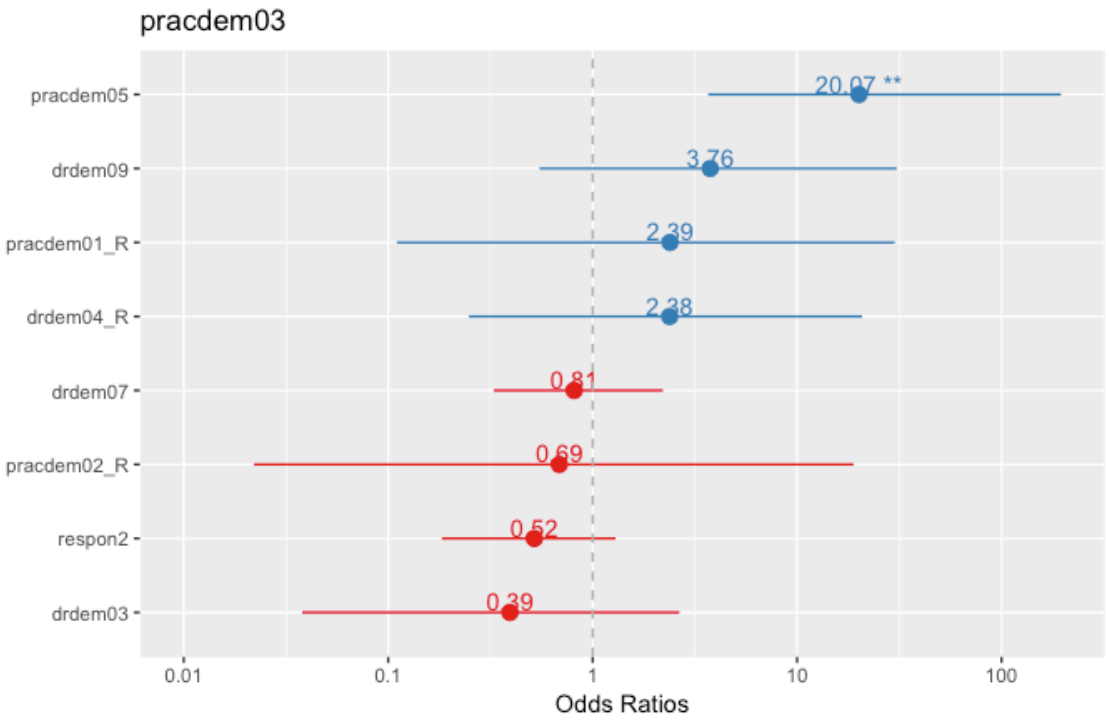
For model three, past Medicaid acceptance significantly predicted current Medicaid acceptance [C^2 (8) = 7.81, p = 0.452)]—Table 11. Individuals that accepted Medicaid in the past were 21.80 times (95% CI: 3.87,222.42) more likely to currently accept Medicaid than individuals that never had. In this model, the concordance index is fine at 0.864. A c-index greater than 80% is good enough for predicting the outcomes of individuals.

Figure 3. Social justice, education, & economics component model odds ratios



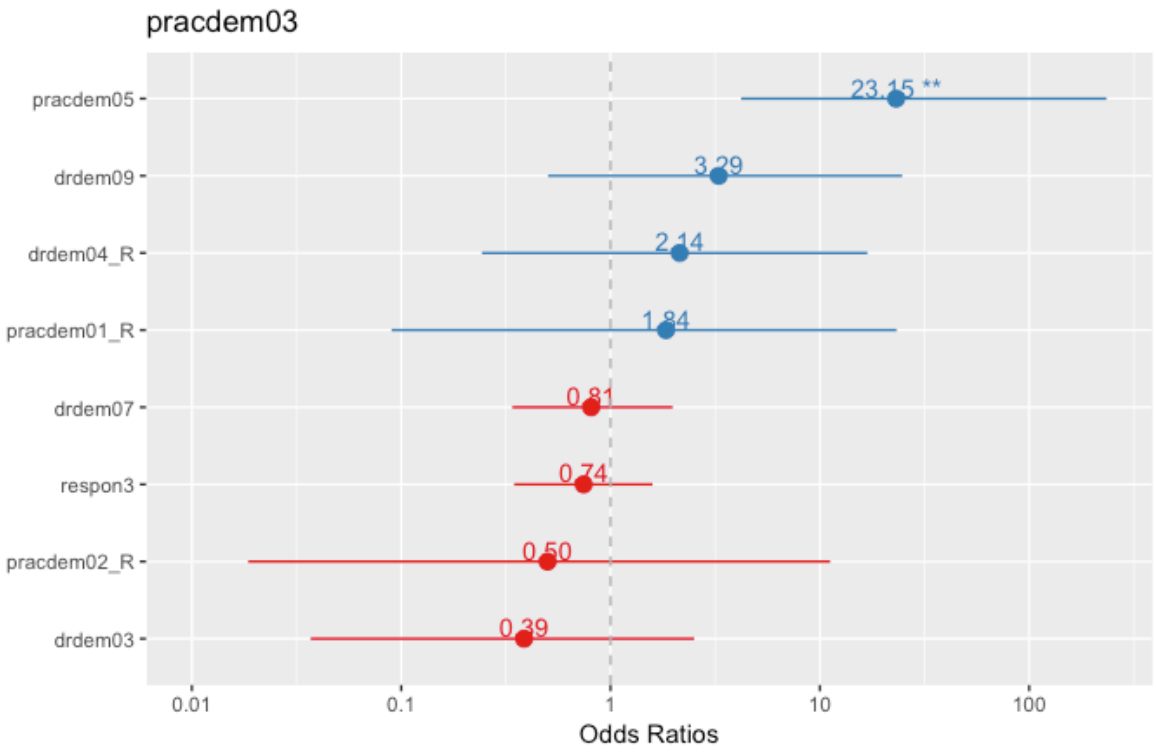
For model four, past Medicaid acceptance significantly predicted current Medicaid acceptance [C^2 (8) = 7.62, p = 0.470)]—Table 11. Individuals that had accepted Medicaid in the past were 20.07 times (95% CI: 3.67,195.10) more likely to currently accept Medicaid than individuals that never had. In this model, the concordance index is fine at 0.895. A c-index greater than 80% is good enough for predicting the outcomes of individuals.

Figure 4. Patient compliance component model odds ratios



For model five, past Medicaid acceptance significantly predicted current Medicaid acceptance [C^2 (8) = 4.24, p = 0.833)]—Table 11. Individuals that had accepted Medicaid in the past were 23.15 times (95% CI: 4.21,234.17) more likely to currently accept it than individuals that never had. In this model, the concordance index is fine at 0.884. A c-index greater than 80% is good enough for predicting the outcomes of individuals.

Figure 5. Access to care component model odds ratios



Chapter 4: Discussion

Our study showed that most of the orthodontists that responded do not participate in Medicaid (87.5%, N=112). When considering the rate of Medicaid acceptance (12.5%, N=16), one must also consider our study's response rate (27%). It's possible that a proportionally larger number of Medicaid participants responded to the survey compared to non-participants due to the applicability of the topic to their work-life. While there's no way to control for this possible variance in self-interest among the groups of survey respondents, it may inflate the reported access to care. Even if our Medicaid-participant numbers are proportionately inflated, it still may not represent an adequate number of orthodontists that can care for the low-income-child population. This is inadequacy is likely given that approximately 24% of Florida children live in poverty.[49]

Previous research in Florida has found higher rates of participation in Medicaid among pediatric and general dentists who are in a racial minority.[37] [38] A study by Logan et.al. in 2013 found that African American orthodontists across Florida and Hispanic orthodontists in south Florida were more likely to participate in Medicaid than other racial and ethnic groups of Florida dentists.[37] This characteristic was also found in a study done in Wisconsin, where minority dentists were two times more likely to accept Medicaid than non-Hispanic white dentists.[38] In our study, higher percentages of orthodontists that participate in Medicaid were reported to be in the racial minority than were reported for the non-participating group. While a greater overall number of minority orthodontists reported to be non-participants, this may still indicate that minority orthodontists may be more open to accepting Medicaid as a group, as is supported by the previously mentioned

studies. This is supported by our finding that Hispanic respondents agreed more with the statements in the Social Responsibility scale, as seen in Table 4.

The number of years in practice was found to be an insignificant factor in Medicaid participation. However, with a p value of 0.051, a relationship nearly exists: more orthodontists that have been in practice fewer than five years accept Medicaid. It would be reasonable if this conclusion could be drawn, as a greater number of doctors early in their careers may work for dental chains or corporations, who may have a higher rate of Medicaid acceptance.

Our study's bivariate analysis of respondents' ABO certification revealed a statistically significant greater percentage of Medicaid participants (56.3%) that were ABO certified than non-participants (28.4%). However, when plugged into our odds ratio models, this relationship was not found to be significant. The seemingly higher rate of ABO certification among Medicaid-accepting orthodontists is likely due to an uneven representation in survey responses. 38% of ABO certified orthodontists responded to the survey, whereas 19% of non-ABO certified doctors sent back responses. The reason for this discrepancy is unknown, but it's possible that ABO certified doctors may be more involved in the orthodontic community and therefore more likely to respond to an orthodontics-related survey.

The lower rate of financial authority over the decision whether or not to accept Medicaid among Medicaid participants (72.7% vs. 92.3%) indicates that these orthodontists are employees of a group practice that has determined the financial policies. This data implies that larger practices, including Dental Service Organizations (DSOs) treat more

Medicaid patients. This is supported by our findings that more early-career orthodontists treat Medicaid patients, as these doctors often work as an associate in a group practice.

The mean and median values of the results of our study show the unified opinion of Florida orthodontists that the Medicaid program has a significant administrative burden. While there was a significant difference in the responses of the Medicaid participants and the non-participants in the questions regarding the importance of complicated paperwork, the rate of reimbursement, and denial of payment, the responses between groups were still in agreement that these are important considerations. The Medicaid-participating group's lower (i.e. less importantly ranked) mean and median values for these potential barriers to participation may indicate that they have found the ability to navigate the system to a certain degree of success, yet they recognize the aspects that need improvement. For instance, the paperwork required for case approval would likely be predictable, albeit cumbersome, in an office that had adequate staff employed to meet the extra time-demand. Likewise, provider (re)certification paperwork only has to be updated periodically, yet this would require more time for a doctor navigating the system for the first time. This time required, even for a provider experienced with the system, is still perceived to be significant, as one doctor explained, "It is nearly impossible for a solo practitioner to comply with OSHA, DOL, ADA, FDA, and Department of Health regulations and (to) treat patients to a board-quality outcome at the current Medicaid reimbursement level in the U.S. Health Care providers across all disciplines do not treat Medicaid patients because the reimbursement levels are too low."

Denial of payment may have been rated as less important by Medicaid providers because this group has first-hand experience of the frequency at which this occurs, whereas the non-participants may just perceive this to be a relevant fear, and therefore rate it as more important. Therefore, experience in accurately evaluating the complexity of each potential case likely decreases the incidence of denial of payment for a case prematurely begun.

The rate of Medicaid reimbursement may also be likely to be found more acceptable by experience: providers have found ways to make the reimbursement worth their time. This is frequently accomplished through a high patient and volume, low fee and material overhead practice model. This practice model was mentioned by one of the survey respondents who stated, “I treat many Medicaid patients now. I have low down payments and extend payment plans. I already operate at such a high overhead/low profit that I am now personally impacted by this low profitability (in reference to the low reimbursement rate).” However, many orthodontists aren’t able to make their practice’s infrastructure economically viable due to the high overhead cost of having more staff and/or offsetting the cost of supplies, as was stated by survey respondents, “reimbursement does not equal the cost of treatment” and “it is not practical to mix Medicaid-ortho business model with non-Medicaid”. Orthodontists also expressed their frustration with the inconvenience of the administrative burden in that they “would rather treat for free than navigate the Medicaid system.”

Several of the survey respondents volunteered their solution for the administrative burden by treating a segment of the low-income population by reducing the fees charged to

patients who have Medicaid health benefits. This by-passes the Medicaid paperwork, but often cases are not treated at no cost to the patient, as they would be if their case was accepted by Medicaid. Some doctors reported charging the patient the same price as the Medicaid reimbursement rate and allowing extended payment plans to increase patient ability to afford treatment. Several doctors wrote that it is "easier to give patients reduced fees than to deal with the (Medicaid) system. Plus, patients that pay $25/month take the treatment more seriously." An advantage to this private-sector solution would be the elimination of the strict case eligibility based on the severity of malocclusion. This may allow any low-income patient to have access to more affordable orthodontic treatment. In order to gauge if this may be a solution that significantly affects the access to care problem, our study asked orthodontists to report their estimate of the average number of cases they treated in 2016 for a fee reduced by 50% or greater, due explicitly to the patient's financial hardship. Interestingly, we did not see a statistically significant difference in the median number of reduced-fee cases between Medicaid participants and non-participants. Medicaid non-participants appeared to treat a higher number of these reduced-fee cases than participants (median of 5 with a range of 0 to 90 versus a median of 1 with a range from 0 to 30). This lack of a meaningful difference and the low number of patients indicates that non-participants aren't having a large effect on the community through self-governed philanthropy in this regard. When examining the range of responses, it appears that there are a small number of doctors that seem to be making a marked effort to care for socioeconomically disadvantaged children and adolescents in their community. However, it

is possible that this conclusion may be skewed by the study's relatively limited sample size along with the low number of Medicaid participants.

Other suggested solutions included finding ways to increase patient compliance beyond requiring a minor financial investment of the patient. One such suggestion was to include requiring a history of excellent appointment attendance and to have a record of good oral hygiene before treatment in order to obtain eligibility for orthodontic coverage. In order for this to be meaningful, it would require reports from both the patient's pediatric/general dentist regular visits over a set observation period and from the potential orthodontist's initial records/consult visits. It is likely that requiring more communication through the Medicaid system would slow down the approval process and perhaps decrease the number of patients that ultimately get approved. The benefit of such a change would be that these approved patients would have already demonstrated high motivation for treatment, making case completion in a timely and quality manner more easily achieved by the orthodontist.

Another solution proposed by survey respondents was to better educate the public about the selective nature of Medicaid-covered orthodontics. One doctor wrote, "Medicaid misleads patients making them believe they can get approved for orthodontic treatment but then they require that it has to be medically necessary… I worked in a corporation for over a year and they take Medicaid but only as a marketing tool to get patients into the door to charge them full fee." Patients may believe that Medicaid covers all dental treatment, including orthodontics, due to prior experience in being able to receive most of the treatment sought out from dentists and doctors. As for this doctor's claim that

corporations may mislead patients in order to bait them into their practice, if there is truth in this, it may be mitigated by a change in regulation to dental Medicaid advertising. The addition of a disclaimer on advertisements stating that each case must be individually evaluated for qualification due to the severity of the dental problem may help reduce misguided patient perceptions. A more informed population of potential patients would likely decrease orthodontists experience of patients "who are angry that they did not qualify", as one survey respondent explained.

A need for increasing patient education was further found in the results of our study. Through our bivariate comparisons of Perceived Barriers and Social Responsibility scales we found that Medicaid participants significantly agreed more than non-participants with the statement, "Many parents with children receiving Medicaid support lack the education to make informed choices about the oral health needs of their children" While the median response for non-participants was "somewhat disagree", the median of Medicaid participants responded "somewhat agree". If a lack of education does exist among these parents, non-participants may have not reported as a greater level of agreement due to a lack of exposure to this patient population in their practices. In other words, Medicaid participants may be able to form more meaningful opinions about their Medicaid patient population due to their frequent experiences working with them. Due to non-participants' lack of first-hand exposure to Medicaid patients and their parents, our study may have been able to capture a more representative response if there were a neutral option for their responses.

Our study also revealed that orthodontists that accept Medicaid patients were more likely than non-participants to respond in agreement to the statement: “Patients who pay for treatment out of pocket would not like being in a waiting room with Medicaid patients”. This seemingly controversial result may be due to the previously-mentioned practice model of having high patient volume. Due to the largely elective nature of orthodontics, doctors may believe that private-pay patients expect a certain experience in the office, namely, the patient perception that they are receiving first-class care by receiving more doctor or chair time. A large number of patients in the waiting room may diminish this perception and therefore affect potential patient-driven referrals and indirectly practice profitability.

Our results with the highest statistical significance involves past Medicaid acceptance: Across all five of our odds ratio models, orthodontists that were Medicaid providers in the past were twenty to twenty-eight times more likely to be current Medicaid providers. This finding is supported by theories in psychology that suggest past behavior as an indicator of future behavior.[52] However, past behavior is by no means a certain predictor of behavior. One of our survey respondents explained, “I provided Medicaid services for many years… I stopped being a provider. I tried again to enroll in Medicaid but it is impossible. The number of emergencies with the Medicaid group was astronomical compared to others.” Emergencies constitute one of the factors of patient noncompliance that was inquired about in our survey, as a part of the patient/referral related principal component of the Perceived Barriers scale. Our analyses also found that a one unit increase in the administrative burden component suggests that subjects were 65% less likely to have accepted Medicaid in the past. This result highlights the significance of complicated

paperwork, denial of payment, and the rate of reimbursement in orthodontists' decision whether or not to accept Medicaid.

Finally, our study also reports an encouraging finding: Medicaid participants agreed significantly more than non-providers with the statement, "if I became a Medicaid provider I could have a positive impact on my community." This sentiment of social responsibility was echoed in the comments of some of the survey respondents. One doctor wrote, "I have participated (in Medicaid) for many years and it has been and continues to be a very rewarding experience, specifically, I feel that I have made a positive impact on many young people with all races and ethnicities. Especially in helping with their self-esteem and that makes me feel good about myself. It has been rewarding for everyone involved".

Chapter 5: Conclusions

The most striking finding of our study was that orthodontists that were Medicaid providers in the past were twenty to twenty-eight times more likely to be current Medicaid providers. This may indicate the importance of familiarity with the program's intricacies and having the "infrastructure" in one's practice to handle the unique administrative and financial demands. Orthodontists who have previously accepted Medicaid may have therefore found a way in which it's economically viable for them.

Our study's demonstration of the perception of administrative burden as a determinant of Medicaid participation points to the factors that requires the most change: the Medicaid program's bureaucracy and its rate of reimbursement. Having authorization processes and reimbursements that more closely mimic those of private insurance would likely have a significant effect on orthodontist participation, as all but one respondent reported that they accept private insurance. This is indirectly supported by our study findings that indicate that orthodontists that participate in Medicaid do not make their decision to participate based on significantly different ideological factors or a sense of social responsibility that is different from non-participants. An increase in Medicaid participation would more evenly distribute the care for the socioeconomically disadvantaged children and adolescents in their community beyond the small number of doctors that currently accept Medicaid and those doctors that offer a large number of reduced-fee cases.

5.1: Strengths and Limitations

The results of our study show the unified opinion of Florida orthodontists that the Medicaid program has a significant administrative burden, including a reimbursement rate

that's too low. This agreement points to potential solutions to increase program participation, namely increasing the reimbursement rate and streamlining the process for case approval.

Ultimately, our conclusion may be skewed by the study's relatively limited sample size along with the low number of Medicaid participants. In fact, it may be possible that a disproportionately high percentage of Medicaid participants responded to our survey due to their greater personal interest in the topic, which may have minimized the statistical differences in our results between Medicaid and non-Medicaid groups.

5.2: Future studies

Future studies could evaluate a change in the rate of Medicaid participation among Florida orthodontists, which would be especially informative following a significant program policy change or a change in the prevalent practice model types. For example, an industry-wide increase in large group practices with an emphasis on providing to low-income families would likely have a profound effect on care received by Medicaid families. Such a study could ask about patient volume, the out-of-pocket fees charged, and even their location based on population density to evaluate the access to care on a more specific level. The average duration of participation in the Medicaid program amongst orthodontists could also be assessed in the future to see if program participation is treated as a stepping stool early in one's career as an associate or if it's usually incorporated into one's more permanent private practice management model.

Our findings of higher participation among orthodontists that have a history with the program may increase the utilization of Medicaid covered orthodontics if orthodontists receive early exposure to Medicaid's processes, criteria, and practice implications. Experience with Medicaid during residency training may familiarize new graduates with the intricacies of the program and therefore possibly enable a greater sense of comfort in dealing with the administrative burdens of Medicaid so that it may be easier to implement in their future private practices. Conducting a longitudinal study that followed the choices of residents that graduated from programs in which they treated Medicaid patients and from those that did not treat these patients may help us see the difference that early exposure has on Medicaid participation throughout their careers.

Appendix: Survey Instrument

Study ID#: __ __ __ __ __ __

Practitioner Demographics:

1. Are you an actively practicing orthodontist?
    a. Yes
    b. No
2. Please select the extent of your practice time:
    a. Full time (30 or more hours/week)
    b. Part time (Less than 30 hours/week)
3. Please select your gender:
    a. Male
    b. Female
    c. Other
4. Please select your race:
    a. White,
    b. Black or African American,
    c. American Indian or Alaska Native
    d. Asian
    e. Native Hawaiian or other Pacific Islander,
    f. Other
5. Are you of Hispanic or Latino ethnicity?
    a. Yes
    b. No
6. What is your age? ☐☐
7. How many years have you been practicing as an orthodontist?
    a. Fewer than 5 years
    b. 5 years to 9 years
    c. 10 years to 20 years
    d. More than 20 years
8. Are you a member of the American Association of Orthodontists (AAO)?
    a. Yes
    b. No
9. Are you American Board of Orthodontists (ABO) certified?
    a. Yes
    b. No

Practice Demographics:

10. Please select which best describes your primary employment:
    a. Solo private practice
    b. Co-owner of a group practice
    c. Associate at a group practice
    d. Faculty in a university orthodontic program
    e. Public health orthodontist
11. In your primary practice, do you have authority over the decision whether or not to accept Medicaid or other insurances?
    a. Yes
    b. No
12. Do you currently accept Medicaid patients for orthodontic treatment?
    a. Yes
    b. No
13. How many Medicaid patients began treatment in your office in 2016? ☐☐☐ (enter the number)
14. Have you accepted Medicaid for orthodontic treatment in the past?
    a. Yes
    b. No
15. For how many years have you been a Medicaid provider? (enter in number) ☐☐
16. In your primary practice, do you accept private dental insurance reimbursement for orthodontic treatment?
    a. Yes
    b. No
17. How many patients treated in your office in 2016 were offered fees discounted ≥ 50% due to family financial hardship? (enter the number) ☐☐☐

CONTINUED ON NEXT PAGE

Perceived Barriers

18. Please describe how important or unimportant each of the following factors are in your decision to accept or not accept Medicaid patients.

		1 **Unimportant**	2 **Somewhat unimportant**	3 **Somewhat important**	4 **Important**
a	Need for prior approval				
b	Complicated paperwork				
c	Frequent changes in regulation				
d	Denial of payment				
e	Rate of reimbursement				
f	On-and-off eligibility of patients				
g	Patients often fail to show for appointments				
h	Unruly/uncooperative patient behavior				
i	Difficulty in finding other specialists (pediatric dentists, oral surgeons) who accept Medicaid.				

Social Responsibility

19. Please describe how much you agree or disagree with the following statements regarding social concerns in your orthodontic practice:

		1 **Disagree**	2 **Somewhat Disagree**	3 **Somewhat Agree**	4 **Agree**
a	Patients who pay for treatment out of pocket would not like being in a waiting room with Medicaid patients.				
b	Ethically, dental professionals are obligated to provide care to the underprivileged.				
c	My colleagues will think less of me if they know I see Medicaid patients.				

		1 **Disagree**	2 **Somewhat Disagree**	3 **Somewhat Agree**	4 **Agree**
d	I would never turn any patient away regardless of their background or socioeconomic status.				
e	The traditional model of fee-for-service dentistry adequately addresses the oral health needs of underprivileged patients.				
f	If I became a Medicaid provider I could have a positive impact on my community.				
g	Children enrolled in Medicaid are less likely to be comply with treatment compared to non-Medicaid patients.				
h	Medicaid patients frequently cancel appointments.				
i	I do not feel obligated to provide dental care to the underprivileged because we have a free-market economy.				
j	Many parents with children receiving Medicaid support lack the education to make informed choices about the oral health needs of their children.				
k	Access to general healthcare is a right of all people.				
l	Access to oral health care is a right of all people.				
m	Access to orthodontics is a right of all people.				
n	I cannot financially afford to treat Medicaid patients.				

		1 **Disagree**	2 **Somewhat Disagree**	3 **Somewhat Agree**	4 **Agree**
o	Neither my dental school nor residency curriculum prepared me to address oral health disparities in underprivileged and minority patients.				
p	Medicaid patients have dental needs that are more difficult to treat compared to other patients.				
q	I believe orthodontists have a moral responsibility to participate in Medicaid in order to serve the oral healthcare needs of the underprivileged.				

20. Do you have any comments about the Medicaid program as it pertains to you or your practice that you would like to share with us?

_____
_____
_____
_____
_____
_____
_____

Bibliography

1. Im, J.L.; Phillips, C.; Lee, J.; Beane, R. The North Carolina Medicaid Program: Participation and perceptions among practicing orthodontists. American Journal of Orthodontics and Dentofacial Orthopedics. 2007; 132(2): 144.e15-144.e21
2. https://www.medicaid.gov/medicaid/eligibility/index.html
3. https://www.medicaid.gov/chip/eligibility-standards/index.html
4. https://www.medicaid.gov/medicaid/benefits/dental/index.html
5. Florida Agency for Health Care Administration. Florida Medicaid Dental Services Coverage and Limitations Handbook. 2011; 2-15, 2-16.
6. https://www.aaoinfo.org/news/2015/07/aao-leads-effort-establish-consistency-medically-necessary-orthodontic-care
7. http://www.dentaquest.com/getattachment/State-Plans/Regions/Florida/FL-Dentist-Page/446398_1_0_FL_Medicaid.pdf/ pg 54-60
8. http://ahca.myflorida.com/medicaid/review/General/59G_5020_Provider_General_REQUIREMENTS.pdf provider enrollment requirements
9. http://ahca.myflorida.com/medicaid/Policy_and_Quality/Quality/clinical_quality_initiatives/oral_health/index.shtml
10. https://www.medicaid.gov/medicaid/benefits/downloads/2015-dental-and-oral-health-domain-specific-report.pdf
11. Boylston Herndon J. Dental and Oral Healthcare Service Use in Florida Medicaid: Centers for Medicare and Medicaid Services (CMS) Early and Periodic Screening, Diagnostic, and Treatment (EPSDT). Oral Health Florida Data Action Team; June 2016. https://cod-oralhealthflorida.sites.medinfo.ufl.edu/files/2017/05/CMS_EPSDT_Data_June2016Update.pdf
12. Decker, S.L. Medicaid payment levels to dentists and access to dental care among children and adolescents. JAMA. 2011 Jul 13;306(2):187-93
13. Decker, S.L. The effect of physician reimbursement levels on the primary care of Medicaid patients. *Rev Econ Household*. 2007;5(1):95-112
14. Zuckerman, S.; McFeeters, J.; Cunningham, P.; Nichols, L. Changes in Medicaid physician fees, 1998-2003; implications for physician participation. *Health Aff (Millwood)*. 2004;Jan-Jun: W4-374-384
15. http://ahca.myflorida.com/medicaid/review/Reimbursement/2017_01_01_Dental_Fee_Schedule.pdf
16. Florida Medicaid Dental Services Coverage Policy. Agency for Health Care Administration. 2016. 59G-4.060%20Dental_Coverage_Policy_Adoption.pdf
17. Mofidi, M.; Rozier, R.G.; King, R.S. Problems With Access to Dental Care for Medicaid-Insured Children: What Caregivers Think. Am J Public Health. Jan 2002; 92(1): 53-58

18. King, G.J.; Hall, C.V.; Grembowski, D.E. Early orthodontic treatment as a means to increase access for children enrolled in Medicaid in Washington state. J Orthodontics and Dentofacial Orthopedics. 2006; 137(1): 86-94.
19. El-Gheriani, A.A.; Ehrmantrout, Z. P.; Oesterle, L.J.; Wilkersond, D.C. Medicaid expenditures for orthodontic services. J Orthod Dentofacial Orthop. 2007; 132:728.e1-728.e8
20. The *Dental Economics* / Levin Group 2014 Annual Research Report. http://levingroup.com/pdf/DELGSurvey_Article_Nov2014.pdf. Nov. 2014.
21. Murdock, J.E.; Phillips, C.; Beane, R.; Quinonez, R. Break-even analysis of Medicaid vs fee for service in orthodontic practice: North Carolina as a case study. J. Orthodontics and Dentofacial Orthopedics. 2010; 137(3): 334-339.
22. American Dental Association. Medicaid reimbursement for the New England region: using marketplace principles to improve access to dental services. Chicago, IL: American Dental Association; 2004. http://asplegacydev.ada.org/sections/professionalResources/pdfs/medicaid_newengland.pdf
23. U.S. Department of Health and Human Services. Children's dental services under Medicaid access and utilization. Washington, DC: U.S. Department of Health and Human Services; 1996.
24. Venezie RD, Garvan CW, Mitchell GS, et al. Accessibility and barriers to dental care in the Florida Medicaid program: a report to the Agency for Health Care Administration. Gainesville, FL: University of Florida College of Dentistry; 1997.
25. American Dental Association. State and Community Models for Improving Access to Dental Care For the Underserved— A White Paper. Chicago: American Dental Association: 2004.
26. Wilson, J.J.; Harris, E.F. Compliance by state-subsidized and self-pay orthodontic patients. J. of Orthodontics and Dentofacial Orthopedics. 2015;148(4): 628-632.
27. Horsley, B.P.; Lindauer, S.J.; Shroff, B; Tufekci, E; Abubaker, A.O.; Fowler, C.E. Appointment keeping behavior of Medicaid vs non-Medicaid orthodontic patients. Am J Orthod Dentofacial Orthop 2007;132:49-53.
28. Dickens, S.; Beane, R.A.; Caplan, D.J.; Vann, W. Comparison of Treatment Result and Compliance between Private Practice Medicaid and Non-Medicaid Orthodontic Patients – A Brief Communication. J. Public Health Dent.2008 Summer;68(3):167-9.
29. United States Census Bureau QuickFacts: UNITED STATES; Florida [Internet].: U.S. Department of Commerce; 2016 [updated July 1; cited 06/30/2017]. Available from: https://www.census.gov/quickfacts/fact/table/US,FL/PST045216.
30. Humes, K.R; Jones, N.A.; Ramirez, R.R. Karen R. Overview of Race and Hispanic Origin: 2010. U.S. Census Bureau. 2011; http://www.census.gov/prod/cen2010/briefs/c2010br-02.pdf
31. Proctor BD, Semega JL, Kollar MA. U.S. Census Bureau, Current Population Reports. Income and Poverty in the United States: 2015. Washington, D.C.: U.S. Government Printing Office; 2016. Report No.: P60-256(RV).

https://www.census.gov/content/dam/Census/library/publications/2016/demo/p60-256.pdf
32. Vujicic, M.; Nasseh, K.; Wall, T. Dental care utilization declined for adults, increased for children during the past decade in the United States. Health Policy Institute Research Brief. American Dental Association. http://www.ada.org/~/media/ADA/ScienceandResearch/HPI/Files/HPIBrief_0213_2.pdf?la=en.
33. Laniado, N.; Oliva, S.; Matthews, G.J. Children's orthodontic utilization in the United States: Socioeconomic and surveillance considerations. Am J Orthod Dentofacial Orthop. 2017;152(5): 672-678.
34. Profitt, W.R.; Fields, H.W.; Moray, L.J. Prevalence of malocclusion and orthodontic treatment need in the United States: estimates from the NHANES III survey. Int J Orthod Orthognath Surg. 1998;13: 97-106
35. Proctor BD, Semega JL, Kollar MA. U.S. Census Bureau, Current Population Reports. Income and Poverty in the United States: 2015. Washington, D.C.: U.S. Government Printing Office; 2016. Report No.: P60-256(RV). https://www.census.gov/content/dam/Census/library/publications/2016/demo/p60-256.pdf
36. Shi L, Stevens GD, Lebrun LA, Faed P, Tsai J. Enhancing the measurement of health disparities for vulnerable populations. J Public Health Management Practice. 2008 Nov;(Suppl):S45–S52.
37. Logan, H.L.; Guo, Y.; Dodd, V.J.; Seleski, C.E.; Catalanotto, F. Demographic and practice characteristics of Medicaid-participating dentists. J Public Health Dent. 2014 Spring;74(2):139–46.
38. Okunseri C, Bajorunaite R, Abena A, Self K, Iacopino AM, Flores G. Racial/ethnic disparities in the acceptance of Medicaid patients in dental practices. J Public Health Dent. 2008 Summer;68(3):149–53.
39. Moy, E.; Bartman, BA. Physician race and care of minority and medically indigent patients. *JAMA*. 1995;273:1515-23.
40. Dharamsi, S.; Pratt, D.D.; MacEntee, M.I. How dentists account for social responsibility: economic imperatives and professional obligations. J Dent Educ. 2007; 71(12):1583-1592.
41. Center for Disease Control and Prevention (CDC) Office of Minority Health and Health Disparities. Racial and ethnic minority population. [cited 2007 May 4]. http://www.cdc.gov/omh/Populations/populations.htm
42. American Dental Association (ADA). 2004 distribution of dentists in the United States by region and states. Chicago (IL): American Dental Association; 2006.
43. Glanz K, Rimer B, Viswanath K, editors. Health Behavior and Health Action: Theory, Research, and Practice. 4th ed. San Francisco: Jossey-Bass: John WIley & Sons, Inc.; 2008: 77.

44. Hoddinott SN, Bass MJ. The dillman total design survey method. Can Fam Physician. 1986;32:2366-2368
45. Borchgrevink, A.; Synder, A.; Gehshan, S. The effects of Medicaid reimbursement rates on access to dental care. National Academy for State Health Policy. Washington, D.C.; 2008. http://www.nashp.org/sites/default/files/CHCF_dental_rates.pdf
46. Logan HL, Catalanotto F. Guo Y, Marks, J.; Dharamsi, S. Barriers to Medicaid participation among Florida dentists. J Health Care Poor Underserved. 2015: 26(1) 154-167.
47. Hing E, Schappert SM, Burt CW, Shimizu IM. Effects of form length and item format on response patterns and estimates of physician office and hospital outpatient department visits. National Ambulatory Medical Care Survey and National Hospital Ambulatory Medical Care Survey, 2001. Vital Health Stat. 2005;2(139):1–32.
48. Jepson C, Asch DA, Hershey JC, Ubel PA. In a mailed physician survey, questionnaire length had a threshold effect on response rate. J Clin Epidemiol. 2005;58(1):103–5.
49. US Census Bureau, American Community Survey, 5-Year, 2010-2014, Table B17024. http://edr.state.fl.us/Content/presentations/social-services/PovertyDemographicsPresentation.pdf
50. The Florida Legislature Office of Economic and Demographic Research. Florida Demographics. http://edr.state.fl.us/Content/presentations/population-demographics/DemographicOverview_4-20-11.pdf
51. McKernan SC, Kuthy RA, Mornany ET, McQuistan MR, Hanley PF, Jones MP, et al. Geographic accessibility and utilization of orthodontic services among Medicaid children and adolescents. J Public Health Dent. 2013;73(Winter):56—64.
52. Rhodes, R.; Courneya, K. Modelling the theory of planned behavior and past behavior. Psychol Health Med. 2003;8(1):57-69.